Wheels to Wings

A 4th through 6th Grade

<< Topic Hot List >>

Introduction

The Internet is rich in sites about the Wright Brothers and the process of invention from bicycles to biplanes. This Topic Hot List has everything from general portals on flight to specific pages from those sites, with compelling activities for 4th through 6th Graders.

1. **Centennial of Flight Commission.** ***Educational Resource Matrix:*** A master, multi-layered resource for teachers from government, industry, and organizations. If you like to have one place to start when beginning your search for materials, then this portal is for you.

http://www.centennialofflight.gov/matrix_intro.htm

2. **Centennial of Flight Commission.** ***Sights and Sounds of Aviation Page:*** Images, Movies, Sounds, and Special Collections are either up and running or are in the works. Start with the "Movies" for some incredible scenes of early powered flight, including the Wright Brothers, Charles Lindbergh, and Amelia Earhart.

http://www.centennialofflight.gov/media/media.htm

3. **How We Made the First Flight" ... by Orville Wright:** Why not read about the process of invention from one of the Wright Brothers directly? Wilbur was in Europe at the time and could not contribute, but he thought his younger brother did a fine job of telling their story. This is a very readable account of what the Wright Brothers accomplished at Kitty Hawk. The illustrations are appealing also.

http://www.aero-web.org/history/wright/wriframe.htm

4. **The Wright Experience.** ***Home Page*****:** The mission of this group is to rediscover the Wright Brothers process of invention by painstaking attention to detail in the reconstruction of Wright 'gliders and fliers'. This means teachers and students can

follow the process over the next few years. In particular, click on the "education" box in the top margin.
http://www.wrightexperience.com/mission/index.htm

5. **The Wright Experience:** ***Inspired by an Inner Tube Box:*** The Wrights were bicycle mechanics and sold everything for the bike rider. How could a simple box have mattered? This is a sample page from the Wright Experience site. Be sure to click on the word "NEXT" in order to learn more. The animation is compelling and it sets up a fuller understanding of the upcoming reference.
http://www.centennialofflight.gov/history/controls/control/ED.htm

6. **The Wright Experience.** ***An Unusual System:*** This enlarges the theme of the "Inspired by an Inner Tube Box" page above, and shows how the twisting of a bicycle inner tube box led to a flexible wing biplane. Animate the image with the "NEXT" prompt.
http://www.centennialofflight.gov/history/controls/F19/ED.htm

7. **First Flight.** ***A Bicycle Balance:*** Let's go across the Atlantic to an English website that has designed some excellent interactive simulations to reveal the process of engineering involved in creating the first airplane. Climb aboard a Wright Cycle and pedal down the streets of Dayton. This was the first time the Wrights tested a curved wing-like surface (*airfoil)* against a flat plate to determine the best curve for lift.
http://firstflight.open.ac.uk/

8. **First Flight.** ***1903 Wright Flyer Simulation:*** This is a fascinating recreation of the flying experience from the perspective of lying on one's stomach across the lower wing of the 1903 Flyer. You can run it at quarter speed, half speed, or full speed; start slow! Go to "Flyers" and then to Wright Brothers for the simulator.
http://firstflight.open.ac.uk/

9. **NASA Quest.** ***Centennial of Flight:*** NASA Quest is a great place to start for any educational project relating to space and aerospace, science and engineering, careers in science and, not surprisingly, the Wright Brothers! A deep, well-organized site, this link takes you right to the resource page for the Centennial celebration.
http://quest.arc.nasa.gov/aero/events/centennial/ed.html

10. **NASA Quest.** ***The Teachers Lounge:*** This lounge is a comfortable location for any educator interested in lesson plans and teacher's guides related to the Wright Flyer. Everything is downloadable in multiple formats.
http://quest.arc.nasa.gov/aero/wright/teachers/

11. **NASA Quest.** ***Lift and Launch Angle:*** Would you like a three to seven day multiple lesson exploration of the concept that the launch angle affects airflow around the wing, and thus affects the amount of lift generated by the wing. This is designed for grades 4th through 8th and includes everything a teacher needs from background for preparation to photographs showing the set up.
http://quest.arc.nasa.gov/aero/wright/teachers/angles/lift_and_angle_of_attack.html

12. NASA Quest. Computing the Net Force: The "Four Forces" of flight can be modeled and graphed through this lesson and the one that follows. Both are designed for middle grade students and are examples of excellent NASA resources in this area.
http://quest.arc.nasa.gov/aero/wright/teachers/wfomanual/math/force.html

13. NASA Quest. Graphing the Four Forces: Mathematics is the substratum of science and it is the keystone of engineering. This session draws on the "Computing the Net Force" lesson above, and shows how it is possible to graph the four forces of flight using the Cartesian Coordinate system. Ideal for the middle grades.
http://quest.arc.nasa.gov/aero/wright/teachers/wfomanual/math/graph.html

Note to Teachers and Parents

A Topic Hotlist is an organized list of web resources centered on a theme or topic. This collection of Internet sites has information regarding the history of aviation and the important contribution of the Wright brothers to the first powered flight. It is designed for teachers who will use the resources to design and develop a unit of study celebrating the hundred years of powered flight. Kindergarten through second grade will require help, as accessibility of the sites will not be appropriate for the developmental level of the learner. Students will build a replica of the Wright brothers plane, create a timeline of the technological advancements of flight, and research important people and events to discover how the world has changed since the Wright brothers first flight. The learners in grades three to five should work cooperatively in groups to research topics of the history of aviation technology, the Wright brothers, the aircraft design process, features of an aircraft, and the basic forces of flight. Using a variety of technology applications students will create multimedia representations (e.g. Hyperstudio, PowerPoint, Web page) depicting the Wright brothers first flight and the advancement of flight over the past 100 years. Teachers will need to create templates for younger children and select appropriate materials in order to adapt activities to the learning ability of the students. Both adults and students will find these sites informative. This is an excellent list to use in conjunction with the NASA Web Quest, "The Wing Warping Controversy".

Addressing the Standards

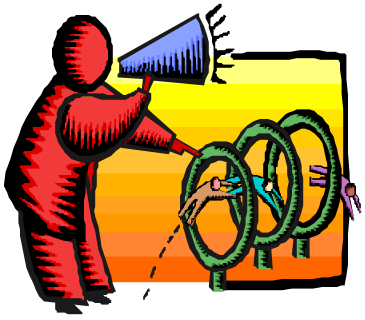
The National Science Education Standards for Grades 4-6.
http://books.nap.edu/html/nses/html/

Science and Technology

Content Standard A – ***Science as Inquiry***

Content Standard E
**** Abilities of technological design***
**** Understandings about science and technology***

Content Standard G – ***History and Nature of Science***



The National Council of Teachers of Mathematics Standards for Grades 3 - 5.

http://standards-e.nctm.org/document/chapter5/meas.htm

Data Analysis:
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them

National Technology Standards

http://cnets.iste.org/

Standard 4: ***Students will develop an understanding of the cultural, social, economic, and political effects of technology.***

Standard 5: ***Students will develop an understanding of the effects of technology on the environment.***

Standard 18: ***Students will develop an understanding of and be able to select and use transportation technologies.***